



Uncl<sup>ed</sup> 1  
Chem-0136  
COPY 1 OF 5

Report No. PR 211-3  
Enclosure (1)

(Unclassified Title)

LOW PRESSURE COMBUSTION INVESTIGATION

Contract No. NOas 59-0117

Marquardt Project No. 211

2 March 1959

PREPARED BY

APPROVED BY

STAT

Combustion Research Department Chief Engineer - Research

ASTRO

A Division of  
Marquardt Aircraft Co.  
Van Nuys, California



Report No. PR 211-3

Enclosure (1)

## I. INTRODUCTION

This is the third monthly letter progress report on Navy Contract NOas 59-0117 (MAC Project 211) for the period 2 February to 2 March 1959.

The objectives of this program are:

- a. to evaluate combustion performance of a 28-inch diameter ramjet engine operating at combustion pressures less than 6 psia for pentaborane, HiCal-3, SF-1, and hydrocarbon fuels
- b. to evaluate the structural reliability of a full-scale nonmetallic tailpipe and exhaust nozzle
- c. to determine the infrared radiation of the exhaust plume of a 28-inch ramjet engine operating at combustion pressures less than 6 psia with pentaborane, HiCal-3, SF-1, and hydrocarbon fuels.

## II. PROGRAM PROGRESS

Due to an approval delay for these tests, on the Air Force operating contract, the MJL Cell 8 occupancy was set back to 26 February 1959. However, the engine installation was completed on Friday, 27 February 1959.

The initial test setup was made with all metal hardware. Figures 1 and 2 are views of the engine in the cell. Figure 1 is an engine side view with a standard metal tailpipe. Figure 2 is an upstream view of the exhaust nozzle, showing the integral fuel injector-flame holder inside the engine. The horizontal tube just inside the exhaust nozzle is a total pressure rake for instrumentation purposes.



Report No. PR 211-3

Enclosure (1)

Checkout runs have been made with both pentaborane and HiCal-3. The engine ignited with ease and burned steady on both fuels at a burner pressure of approximately 3 psia. Since these tests are the first checkout runs, no data have been reduced as yet.

The nonmetallic tailpipe has been received from the Goodyear Aircraft Corp. Figures 3 and 4 show two views of the tailpipe, which is roughly 6 ft long and 28 in. in diameter. From a visual inspection the tailpipe appears to be a well-formed part. After the engine performance points have been run, this tailpipe will be installed for its structural reliability tests.

### III. PROBLEMS ENCOUNTERED

Although the timing on the approval for testing was close, no major problem resulted. However, testing was initiated with only a verbal commitment that a letter contract is forthcoming from the Air Force. Aside from some usual test problems, nothing major in test difficulty has arisen to date.

### IV. ESTIMATED COST TO DATE

The estimated cost, including all commitments, through 27 February 1959 is:

\$65,897



Report No. PR 211-3

Enclosure (1)

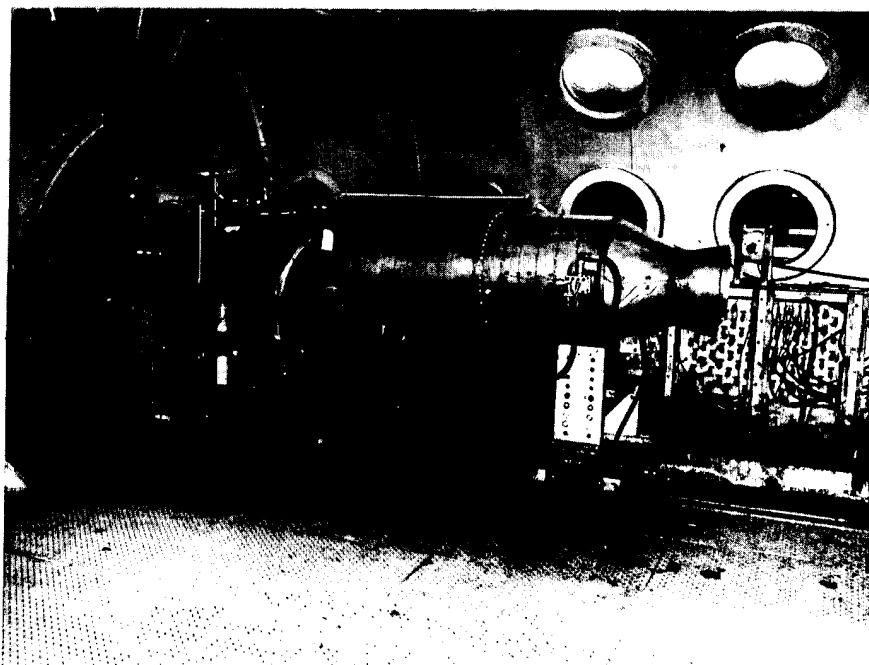


FIGURE 1

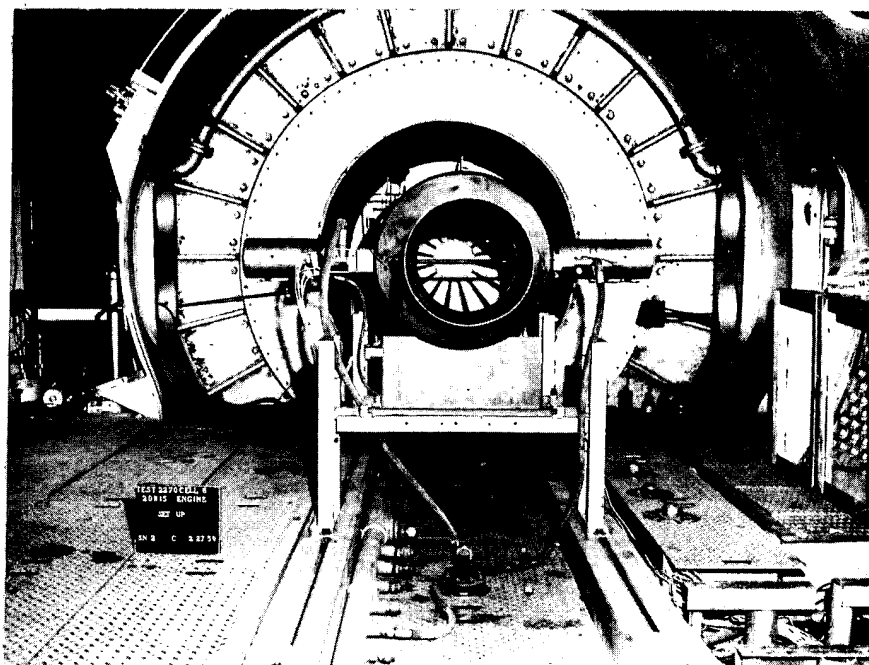


FIGURE 2



Report No. PR 211-3

Enclosure (1)

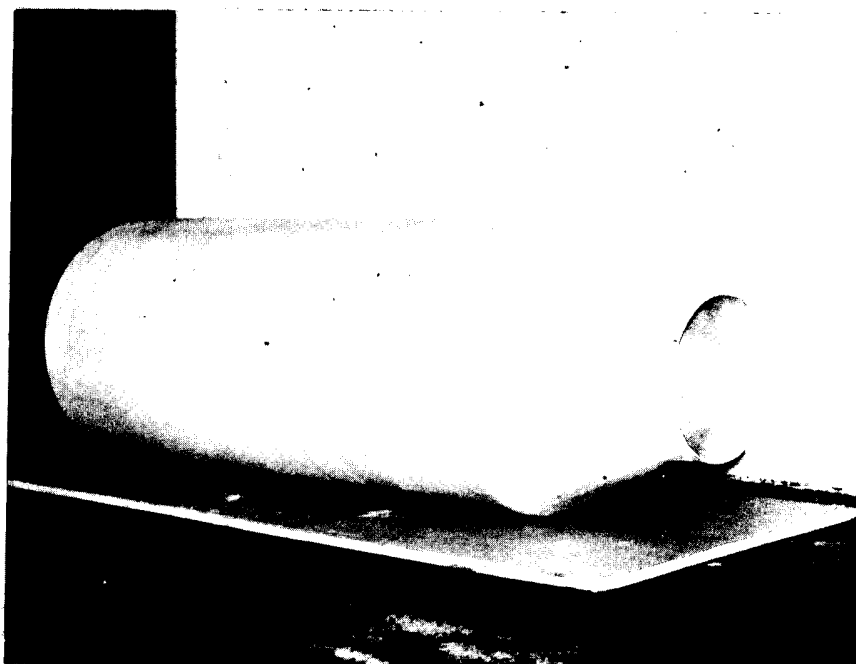


FIGURE 3

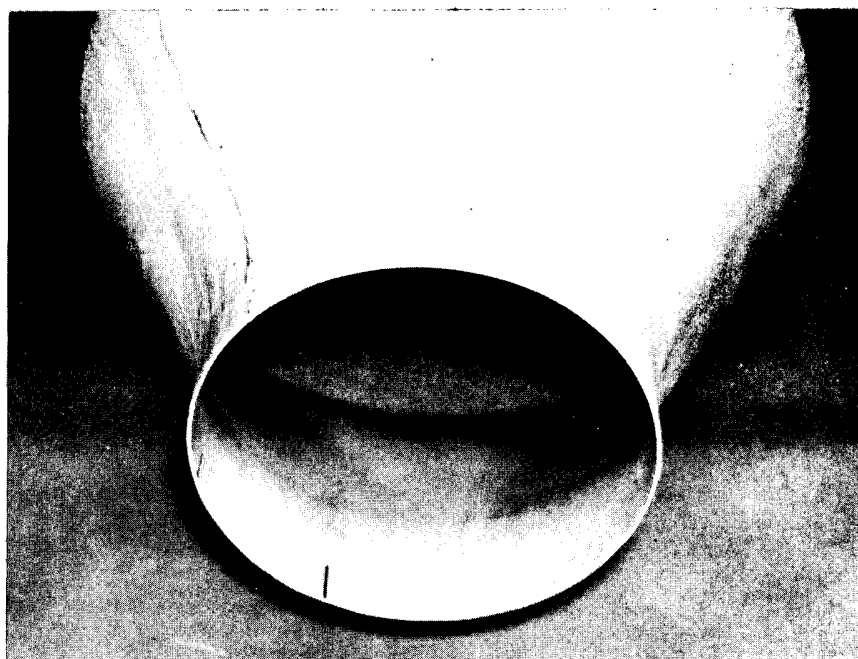


FIGURE 4

CHAM-C132  
COPY / OF /

February 16, 1959

STAT

Subject: Contract NOas 590117 - Approval of Overtime

Gentlemen:

This will confirm our telephone conversation of last week wherein we were advised that overtime might be incurred under subject contract without further approval, to the extent that the premium cost of such overtime does not exceed 3% of the total of direct labor cost and direct material charged to the contract as a whole.

Should the above interpretation of the instructions received not be consistent with your understanding, please advise as soon as possible.

Yours very truly,

MARQUARDT AIRCRAFT CO.


STAT

Contract Administration

OBM:hms

FORM NO. 23  
 IS CHANGE IN CLASS ☐  
 IS DECLASSIFIED ☐  
 DATE: 28/11 BY: TS 80  
 DATE: 24/11 REVIEWER: 010373

CONTAINS SENSITIVE  
COMPARTMENTED INFORMATION

Received Oral approval  
from  by *titecon*

STAT

STAT

File  
EE-600  
A o I